# EXTERNAL TANK PROJECT

# NEW TECHNOLOGY PLAN

**MMC-ET-MA13-0**

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**Contract Number NAS8-30300**

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**DR No. MA13**



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**MICHOUD ASSEMBLY FACILITY**
**NEW ORLEANS, LOUISIANA**

## FOREWORD

This document is prepared and submitted in accordance with Data Requirement Number MA13 of the Space Shuttle External Tank Information Requirements Document, DPD No. 393 dated 17 May 1973 as incorporated in Contract NAS8-30300.

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## 1.0 OBJECTIVE AND APPROACH

The Martin Marietta Corporation has been involved in the national space program since its inception. As a major NASA contractor we are fully committed to the program established by NASA to expedite and implement the transfer of new technology to the non-aerospace business community. To fulfill that commitment, we have instituted procedures to insure prompt disclosure and reporting to NASA of all new technology developed under contract. This New Technology Plan for the Space Shuttle External Tank Project uses those established procedures whose effectiveness has been repeatedly demonstrated in the past. Advances in science and technology which are generated on the ET project will be identified, documented, and promptly reported to NASA to enable timely transfer to other Government agencies and the private sector for benefit of the public.

The Martin Marietta organization responsible for the effective execution of this New Technology Plan at the company, division, and project levels is shown in Figure 1. Basic guidance for this organization and all management personnel is prescribed in a policy directive issued by the President of Martin Marietta Aerospace entitled "New Technology Planning and Reporting - NASA Programs", GM-7 (Appendix A) attached hereto. This directive emphasizes the importance placed on this function by top management. This policy has been implemented by Aerospace Operating Instruction, EN-8,"NASA New Technology Planning and Reporting Procedures" (Appendix B) attached hereto. It defines the program and assigns responsibilities within the company. The Denver Division has implemented the program by Operating Instruction, EN-8-(1)-D1,"New Technology Reporting - NASA Programs" and Standard Procedure, 49.1, "New Technology Reporting" (Appendices C and D) attached hereto.

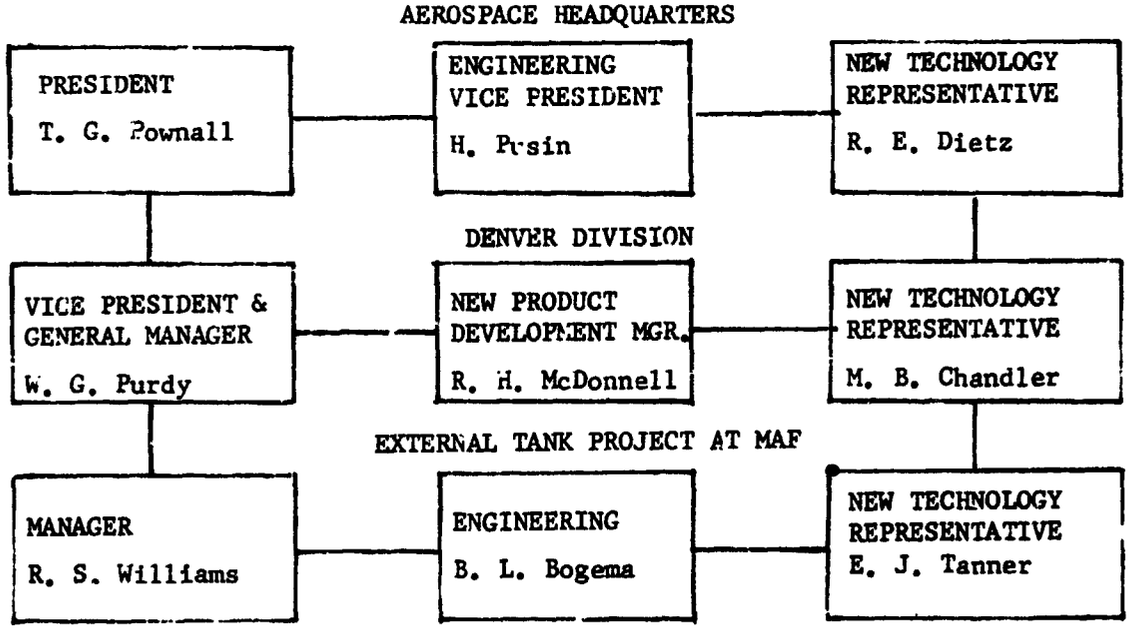


FIGURE 1 - MMC ORGANIZATIONAL REPONSIBILITIES FOR NEW TECHNOLOGY REPORTING

## 2.0 EDUCATIONAL AND MOTIVATIONAL PROGRAMS

At the beginning of the project, ET management personnel will be briefed on the requirements of the NASA New Technology Clause and the procedures for fulfilling MMC's responsibilities in the ET New Technology Statement of Work. The ET New Technology Representative will then hold indoctrination meetings with personnel assigned to each organizational segment of the project. At these meetings, the Technology Utilization (TU) program, reportable new technology, reporting procedures, and individual and company benefits will be described. Copies of Appendices E, F & G attached hereto will be distributed at the meetings. Meetings will be held on a continuing basis for subsequently assigned personnel, and to reindoctrinate others.

As an incentive to encourage reporting of New Technology, the Denver Division has sponsored, since 1967, an Originality in New Technology Awards Program (ONTAP). The ONTAP committee meets monthly and gives monetary awards for the best New Technology disclosures submitted in a given period. Appendix G describes this program. Division and NASA awards to the originators of New Technology disclosures are presented by senior management personnel with photographic coverage. Awards are publicized in Division news media and on bulletin boards throughout the Division. Letters of congratulation and appreciation pertaining to the submittal of award winning NASA New Technology disclosures are sent to project supervisors and to the Personnel Office for inclusion in the employee's files. Outstanding contributors receive further recognition at the annual honors night dinner held by the Division.

The effectiveness of these educational and motivational programs is judged on the basis of the quality and quantity of the New Technology reports submitted during a given period. A quality assessment of each report is made by the supervisor of the originator's organizational segment, the ET Project New Technology Representative, the Division New Technology Representative, the Division Patent Counsel and the ONTAP Committee prior to submittal to NASA.

Discussions with NASA Viking and Skylab Program New Technology personnel underscore NASA interest in the quality of the reportable items as being more significant to fulfilling the intent of the New Technology Clause than any numerical measure. Our projection of proposed goals for submittal of high quality New Technology disclosures on the ET Project is shown in Figure 2. At periodic intervals, we will reassess our progress to determine if goals need to be modified or if we need any change in emphasis in our techniques to generate submission of high quality disclosures.

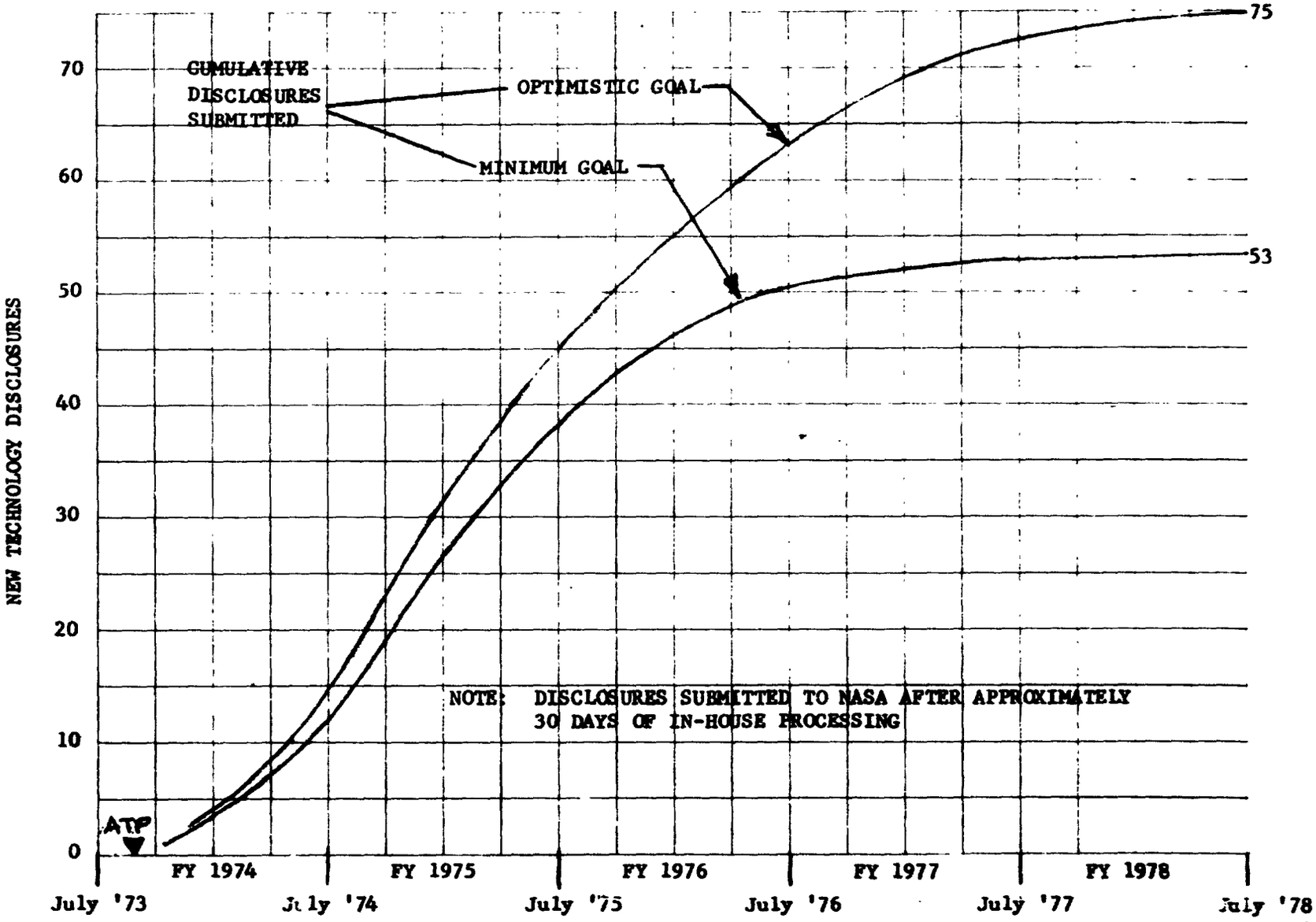


FIGURE 2 - SCHEDULE OF PROPOSED GOALS FOR SUBMITTAL OF N.T. DISCLOSURES

## 3.0 STAFFING THE DIRECT FUNDED EFFORT

The New Technology functional relationship within the ET Project is shown in Figure 3. Management of the New Technology effort is a separately identified direct charge to the project. Individual innovators will, as in previous programs, charge their reporting efforts to the appropriate account for their assigned contract task. Innovations that require unusually significant effort for adequate reporting will be charged to the TU account. The funding estimate contained in the proposal for the execution of the New Technology Plan is based on an initial assessment of the total scope of the New Technology effort. A time phased plan for utilizing the labor hours proposed for funding the New Technology effort will be prepared after the Statement of Work for the Project has been negotiated. A finalized Statement of Work will permit the development of a definitized schedule plan of execution and the assignment of specific responsibilities to selected qualified individuals who will charge against this effort.

Approximately 10% of the New Technology total man-hours will be allocated to developing new methods to stimulate and document New Technology generated under this contract with emphasis on extremely high quality New Technology.

A minimum of 25% of the proposed total manhours will be allocated to selected subcontractors to implement their New Technology effort.

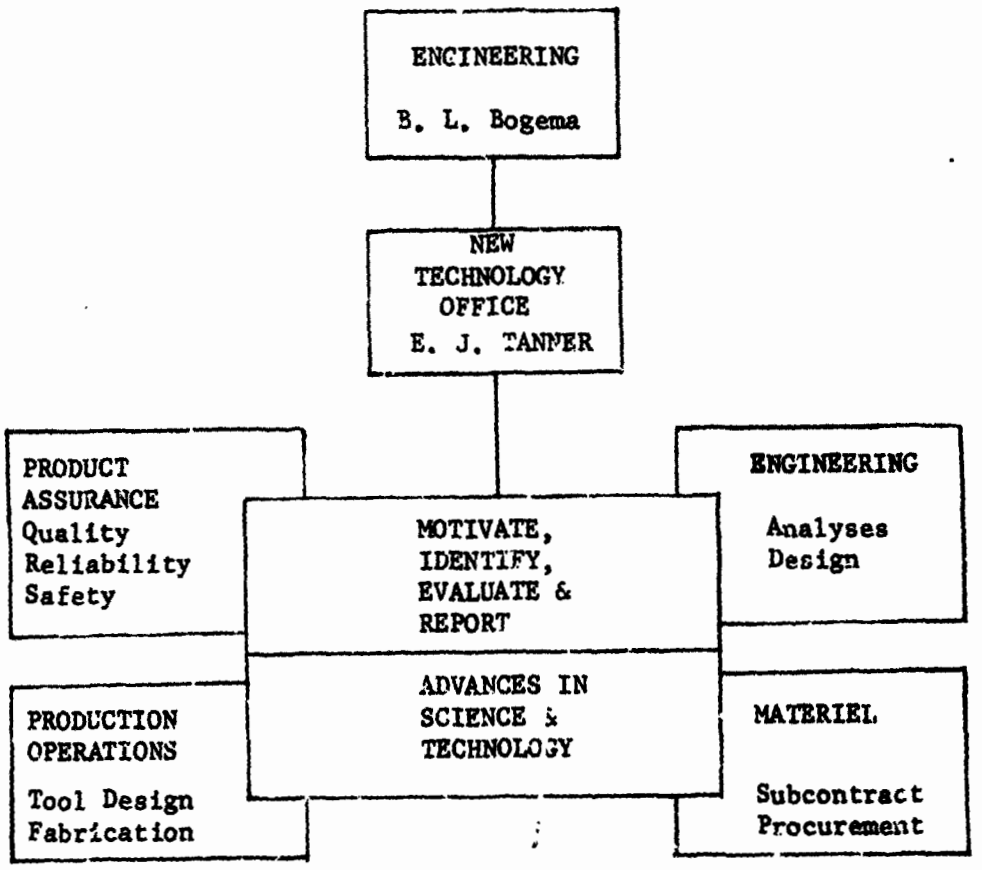


FIGURE 3 - NEW TECHNOLOGY OFFICE FUNCTIONAL RELATIONSHIP WITHIN THE ET PROJECT

## 4.0 IDENTIFICATION AND DOCUMENTATION

The key to the successful New Technology identification and documentation activity is effective education, motivation and encouragement of the project personnel. This will be achieved through the programs described in Section 2. In addition, we will use a search system to ensure early identification of reportable items. Our search system will emphasize reporting higher quality New Technology rather than mere numbers of items reported. The backbone of the search system is the identification of innovative personnel and of high potential innovative areas. Any illustrative listing of specific search areas for ET New Technology is given in Table 1. This search area list will be amplified and updated on the basis of projection of technical problems described in Section 6. It will be used by the ET New Technology Representative in conjunction with the following activities to establish a file of potential New Technology disclosures:

a) Frequent personal contact at all working levels;
b) Reviews of studies, technical notes, and reports;
c) Participation in design reviews;
d) Attendance at staff meetings;
e) Frequent visits to areas of work;
f) Reviews of critical problem areas;

Simple effective documentation procedures previously used on NASA contracts will be used on the ET project. MMC's New Technology Disclosure form (DEN 405010), Appendix H attached hereto, will be used for each reportable item. This form will be prepared by the innovator, with assistance from the Project New Technology Representative, as necessary. These disclosure reports will contain sufficient detail and backup material to permit evaluation of the item for technical quality, novelty, and potential usefulness. Unnecessary redocumentation will be avoided by enclosing existing documents or abstracts when appropriate. A flow diagram of NT Disclosure Reports, Figure 4, displays the entire process from identification of a candidate innovation through transmittal of the report to NASA and public dissemination of release as a Tech Brief or a TU Special Publication. This procedural flow diagram shows the indirect charge utilization of the Denver Division's established New Technology functions in a support role to the ET project at MAF. We will maintain the normal internal processing span of one month established on past programs. This processing will include project review, Denver support actions, contract documentation, and transmittal.

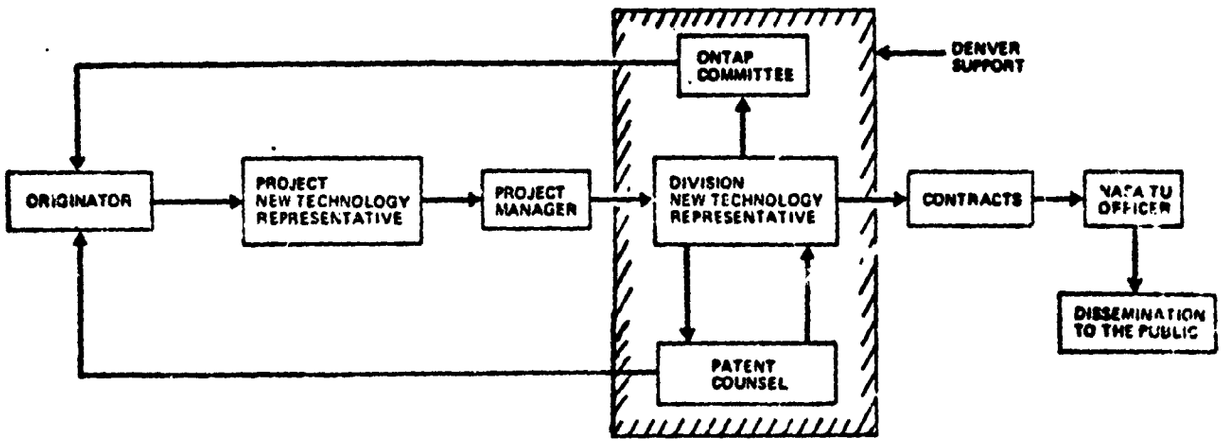


FIGURE 4 - FLOW OF NEW TECHNOLOGY DISCLOSURE REPORTS

TABLE 1 - ILLUSTRATIVE LISTING OF SPECIFIC SEARCH AREAS FOR ET NEW TECHNOLOGY

Thermal Protection System Development

Thermal Coating application techniques:
- spray on foam and ablator
- barber pole
- multi spray gun
- techniques that eliminate the requirement for final machining
- processes for all sprayable TPS

New composite TPS arrangements

New high density foams with superior adhering characteristics that require less machining

Special applications:
- foam over bolts
- spray aluminum struts and fittings with ablator

Manufacturing & Tooling

Welding:
- dual torch welding
- pulsed TIG welding
- processes for welding 2219 alloys
- improved weld verification techniques

Machining:
- barber pole technique
- TPS thickness measuring device technique to drive multiple cutter heads
- machine foam using servo thickness control based on RF reflection
- development of large chip cutter giving relatively dust free machining

Forming and Shaping:
- shot peen forming
- creep forming
- shaping one piece bulkheads

Cleaning:
- methods of cleaning large tankage

Propulsion

Tank outlet arrangements & contours to minimize propellant outages
Composite material feed systems
Geyser suppression

TABLE 1 - (Continued)

Propulsion (Continued)
- Quick disconnect valves
- Redundant butterfly vent valves
- Low temperature seals, spring loaded teflon flange seal
- Alternate design for fluid disconnects retract mechanism

Structural
- Developments in fracture control
- Low temperature rotating and sliding joint seals
- Identification of knock down factors associated with light weight tank stiffening concepts to accommodate joint loading

Testing
- Non-destructive testing technology
- Use of mini-tanks for TPS verification
- TPS covered aluminum panels for static charge & swept lightning effects
- Acquire data for lightning strike verification analysis
- Test aluminum strips over TPS

Lightning Protection
- Electrical developments in conductive material, bonding, shielding, and spark gap arresters for lightning and static charge buildup protection
- Shielded wire protection by ablator from lightning damage
- Aluminum strips over TPS
- Application of conductive paint to TPS to prevent arcing and corona

Ice/Frost
- Accumulation controls

Computer Programs

## 5.0 DISTRIBUTION

Eleven (11) copies and one reproducible master of each New Technology report will be prepared for distribution as directed by MSFC, Technology Utilization Office

## 6.0 PROJECTION OF TECHNICAL PROBLEMS

At the beginning of each six-month period we will provide NASA with a summary of specific technical problems to be solved during the next six-month period. The first summary will be submitted 30 days after execution of the ET contract, with subsequent submissions to coincide with the semi-annual reviews. The Project New Technology Representative will participate in this projection of technical problems. The projection will reflect areas where innovations may be generated to solve technical problems encountered under various disciplines as indicated in Table 2.

TABLE 2 - TECHNICAL DISCIPLINE VS AREA OF DISCLOSURE

| | Technical Discipline | | | | |
|---|---|---|---|---|---|
| Area of Innovation | Thermal Protection Systems | Structures | Propulsion | Electrical | Production Operations |
| Thermal Coating Techniques | X | X | | | X |
| Tank Outage Minimization | | X | X | | X |
| Weld Processes & Verification | | X | | | X |
| Valves Disconnect Vent | | | X | | |
| Low Temp Seals | | X | X | | |
| Composite TPS Arrangements | X | X | | | X |
| Lightning Protection | | X | | X | |
| Computer Programs | X | X | X | | |
| Subcontractors | X | | X | X | X |

## 7.0 SUBCONTRACTORS

We will assume an adequate level of responsibility to assist the Government in assuring subcontractor compliance with the New Technology clause.

All potential ET subcontractors have been apprised of the requirement for compliance with the New Technology clause. We will require selected subcontractors that have a high potential for generating new technology, or where the value of their work is expected to exceed $1 million, to submit a plan for their implementation of the New Technology clause. A work statement covering the basic features of the plan will be negotiated for inclusion in the subcontract.

Withholding provisions similar to those contained in Section V of NASA's New Technology clause will be included in subcontracts where the value of such work is anticipated to exceed $1 million.

Funds to support New Technology effort allocated to subcontractors will be used solely in the implementation of their ET New Technology program.

We will assist subcontractors that have a high potential for generating New Technology, or others who may request it, in understanding their obligations under the New Technology clause. We will also monitor and assist them in their continuing education and motivational programs for New Technology reporting.

Using our in-house efforts, we will assist NASA in identifying reportable New Technology generated by ET subcontractors.

## 8.0 REVIEW OF PUBLICATIONS

On the ET Project, the current policy of the Denver Division as stated in Appendix I attached hereto, "Obtaining and Utilizing Patents" will be maintained. This policy is designed to protect the interests of the Corporation and its customers. Proposed ET publications will be submitted to the Division Patent Counsel for review. The Division Patent Counsel will notify the ET New Technology Representative and the Contracts Manager if the publication may start or has started the stuatory period of limitations barring possible patents rights protection on an invention reportable to NASA under the New Technology Clause. The Contracts Manager will immediately notify the NASA Contracting Officer.

## 9.0 COMPUTER PROGRAMS

Computer programs developed or modified for use on the ET project will be screened for the purpose of selecting high grade computer programs reportable under the New Technology clause. These high grade computer programs will be disclosed on the New Technology Disclosure form (Appendix H). The disclosure will be supplemented, when available, with an accompanying source deck and a user manual describing the program in detail. Such submittals will be through the same screening process as other new technology

9.0 (Continued)

disclosures; namely, approval by head of the originator's organizational element, the Project New Technology Representative, the Division New Technology Representative, the Division Patent Counsel, and a final review by the Originality in New Technology Awards (ONTAP) Committee under the chairmanship of the Division New Technology Representative. During this final committee review, objective evaluations of disclosures are solicited as required, from well qualified individuals to aid in arriving at a decision with respect to an award.

10.0 REVIEWING PATENT APPLICATIONS

To facilitate and expedite NASA considerations under Section 305, Property Rights in Inventions, of the National Aeronautics and Space Act of 1958; arrangements will be made with designated NASA personnel for review of MMC inventions not reportable under the New Technology clause. Inventions subject to such review are those for which a patent application has been filed in the U.S. Patent Office and that are directly related to the work performed under the External Tank contract.

MMC Operating Instruction, GM-1-16-D1, "Obtaining and Utilizing Patents", Appendix I, requires compliance with current customer regulations for statutory bars, publications, use and/or sale, and petitions for waiver. Specific regulations and responsibilities are cited.

When MMC desires a waiver on items that are patentable, such waiver will be requested pursuant to 14 CFR Section 1245.106 of the "NASA Patent Waiver Regulations", as enabled by the new technology clause.

11.0 SPECIAL EFFORT

Creative talent as necessary and consistent with the ET effort will be applied to experiment with and establish new methods of identifying and reporting new technology generated by project personnel.

MMC will also apply special effort to specifically identify high quality new technology and determine the appropriate method of documenting these special items. Our search system described in Section 4, will aid us in placing priority attention on higher quality new technology. The quality of our TU efforts has been high on past programs. Ten percent of the New Technology disclosures presented to NASA have resulted in the issuance of Tech Briefs. Twenty-percent of the disclosures in the last three years have earned awards from MMC's Originality in New Technology Awards Program (ONTAP).

On selected high-quality items, in addition to the normal reporting, special presentation methods such as demonstration models, film, etc, will be recommended to NASA if it is more compatible with the overall objectives of this New Technology effort.

## 12.0 MANAGEMENT REPORTING

### TO NASA

INDIVIDUAL NEW TECHNOLOGY REPORTS - All candidate reportable items will be processed in accordance with MMC policy directives, operating instructions, and procedures. The New Technology disclosure form (Appendix H) will be used to present each reportable item to NASA

QUARTERLY STATUS REPORTS - Three quarterly TU status reports and one annual report will be submitted to NASA/MSFC TU officer each year. These reports will be submitted no later than 20 working days after the end of each quarter and will document problems, accomplishments, trend data, and will include:

a) the total number of reportable items submitted as of the end of the report period,

b) a listing of the reportable items submitted since the previous report,

c) Man-hours expended on direct funded TU effort, monthly and cumulative, as of the end of the month,

d) a summary of the reporting period including participating sub-contractor's TU performance.

SEMIANNUAL REVIEWS - MMC will conduct formal reviews semiannually at MSFC, NASA Headquarters, or at MAF. These reviews will cover in greater detail the information presented in the quarterly reports and will include specific recommendations for further improvement in New Technology identification and documentation. MMC will prepare written proceedings of these reviews and distribute them to the participants within 20 working days of the review date.

FINAL REPORT - After completion of the contract work, MMC will submit a final report in accordance with the New Technology clause.

### TO COMPANY MANAGEMENT

Company and Division management are furnished a quarterly report on all New Technology disclosures submitted to NASA. This report identifies those disclosures selected for awards.

## 13.0 EXTENT OF EFFORT

This External Tank New Technology Plan complies with the requirements of Exhibit B, New Technology Statement of Work of Contract NAS8-30300. The total effort contemplated for the performance of the External Tank New Technology Statement of Work is as set forth in Exhibit B.

[redacted] AEROSPACE GROUP

No. GM-7
Revision 1
Issued 5/25/70
Effective 5/25/70
Page 1 Of 1

[X] Policy

[ ] Operating Instruction

**SUBJECT:** New Technology Planning and Reporting - NASA Programs

The Aerospace Group shall provide and maintain a New Technology planning and reporting program to carry out the intent and objectives of current NASA Procurement Regulations and Directives.

All management shall encourage and stimulate employees to greater accomplishments of invention and innovation, and to no lesser degree, the timely disclosure and documentation of the results of their creativity.

Effective motivational programs, channels of communication and instructions shall be provided to assure timely identification and complete disclosure, collection, review and reporting of New Technology achievements.

Thomas G. Pownall
President

AEROSPACE GROUP

No. EN-8
Revision Origina
Issued 2/25/72
Effective 2/25/7
Page 1 Of 3

[X] Policy

[X] Operating Instruction

**SUBJECT:** NASA New Technology Planning and Reporting Procedures

## I. Purpose

To implement the policy contained in GM-7 by providing for planning, development, disclosure, evaluation and reporting of new technology in order to satisfy the new technology requirements of applicable NASA Procurement Regulations and Directives.

## II. Scope

The provisions of this Operating Instruction, less Paragraph III, "New Technology Planning," apply to all NASA programs without regard to contract price where the conduct of research, experimental, design, engineering or development work is contemplated.

Specifically, the provisions of Paragraph III apply to proposed and contracted NASA programs for which the contract price is or will be in excess of $1,000,000, and in contracts of a lesser value, NASA may also invoke the requirements for a new technology plan at the option of the contracting officer and the technology utilization officer.

## III. New Technology Planning

Whenever Requests for Quotations (RFQ) and Requests for Proposals (RFP) contain the requirement for a plan for new technology reporting, the resultant proposal plan shall be responsive and include:

A. A description of the emphasis given to new technology reporting by ASG top management and the various means used to communicate such emphasis within the contracting division(s).

B. The organizational placement and qualification of Company personnel (program and staff) responsible for new technology indoctrination, evaluation and reporting. Organizational relationships shall be clearly described.

C. Plans for indoctrination of senior program personnel, supervisory and appropriate technical personnel in the benefits, responsibilities and procedures of new technology reporting. The curriculum for indoctrination sessions must clearly define reportable new technology. Provisions for employee recognition and incentive awards should be explained.

D. Plans for conducting the "frequent periodic reviews" required by the New Technology clause.

E. The level of effort anticipated for personnel directly involved in new technology reporting and support, and the number of disclosures which are reasonably expected as reviewed by the senior divisional New Technology Representative.

F. Procedures to assure that new technology requirements are applied to appropriate subcontracts and that reporting requirements are fulfilled by affected subcontractors.

## IV. Awards and Recognition

It is expected that certain new technology items submitted will be of such value or technical significance as to warrant monetary reward or other special recognition for the contributor. Such recognition and publicity shall be utilized as appropriate to generate and sustain employee motivation and to fulfill the goals of new technology development.

## V. Responsibilities

A. ASG-Hq. „ New Technology Representative (appointed by the Vice President, Engineering & Research) shall:

1. Promote the establishment and maintenance of new technology planning and reporting capabilities throughout the ASG.

2. Assure that new technology activities of the divisions are in accordance with stated NASA regulations and Company policy.

3. Maintain liaison with responsible NASA officials on matters of Company new technology capabilities.

4. Maintain liaison with the ASG-Hq. Legal Staff regarding Martin Marietta petitions for waiver of title and patentability of these new technologies.

B. Divisions shall:

1. Establish and maintain a Division New Technology Representative with functional responsibility for the New Technology planning and reporting program.

2. Establish procedures for:

a. New technology indoctrination.

b. Identification, evaluation and reporting of new technology items in accordance with Company policy and customer requirements.

c. The conduct of periodic reviews, documentation and submission of new technology items, and establishment of quotas and schedules for reporting of items.

d. Periodic reporting to the New Technology Representative, ASG-Hq., of all new technology items submitted by title, contract and technological significance.

e. The inclusion of new technology requirements and reporting in appropriate subcontracts.

3. Establish procedures for periodic nomination of selected new technology contributors for consideration for an award of not less than $50 monetary value for contributions deemed to be outstanding.

4. Forward to the Vice President, Engineering & Research, ASG-Hq., annually on or before April 1st, nominations for consideration for special recognition or award by ASG-Hq. for NASA New Technology contributions.

H. Pusin
Vice President
Engineering & Research

[redacted] DENVER DIVISION

# Operating Instruction



**SUBJECT** NEW TECHNOLOGY REPORTING - NASA PROGRAMS

PURPOSE

To establish the responsibility for the orderly planning, development, disclosure, evaluation, and reporting of new technology consistent with established Company policy and to satisfy the new technology requirements of applicable NASA Procurement Regulations and Directives.

SCOPE

The provisions of this Operating Instruction apply to all NASA programs which include the new technology clause.

On specific proposed or contracted NASA programs for which the contract price is or will be in excess of $1,000,000 or on contracts of a lesser value at the option of the contracting officer, the requirements for a formal new technology plan may be involved. In such instances, the plan shall be developed in accordance with Company Operating Instruction EN-12 and the specific Request for Proposal.

RESPONSIBILITIES

* A. The Director of New Product Development shall appoint a Division New Technology Representative who shall have principal divisional responsibility for conducting the New Technology Reporting Program. He shall:

1. Initiate and maintain a program of indoctrination and motivation emphasizing the importance of new technology development and reporting.

2. Coordinate the program with Aerospace Group Headquarters and all involved Division programs to assure consistency, and periodically report status.

3. Coordinate New Technology Reporting Plans for inclusion in proposals.

4. Evaluate proposed New Technology items for suitability and possible award as received from Program New Technology Representatives.

5. Assist Program Management in establishing the New Technology Program on specific contracts.

B. Program Managers on all NASA programs shall appoint a Program New Technology Representative with the following responsibilities:

1. Administer New Technology Reporting on assigned contracts.

2. Assist and motivate program personnel in establishing early identification of items which are candidates to be reported.

*Revised

3. Hold reviews to examine new technology items in accordance with program schedules.

4. Submit award recommendations as appropriate to the Division New Technology Representative.

C. Contracts shall:

1. Identify on proposal authorizations the requirement for New Technology Reporting Plan on new business proposals.

2. Identify reportable new technology items on Contract Data Requirement List (CDRL).

3. Submit New Technology items to Customer in accordance with contractual requirements.

4. Supply required reports and certificates of compliance to Customer.

D. Materiel shall impose the requirement for New Technology Reporting on suppliers and subcontractors in accordance with contractual requirements and secure certificates of compliance as required.

A. E. Hawkins
Director
Administration

APPENDIX D

[redacted]

SUBJECT: NEW TECHNOLOGY REPORTING

NO. 49.1

# Standard Procedure

| APPROVED | DATE | REVISION |
|---|---|---|
| J. A. Auker | 4-30-73 | 2 |

REMARKS: This procedure defines the system for making new technology disclosures in accordance with the requirements of the New Technology Clause of a NASA procurement.

PROCEDURE

I. GENERAL

A. The New Technology Clause is included in all contracts with NASA for research, experimentation, design, engineering, or development work. Under this clause the Denver Division is required to actively search for, identify, and promptly report all new technology resulting from work performed under the contract. NASA withholds funds until the reporting provisions of the clause are complied with.

B. A part of the New Technology Clause must be included in all subcontracts for research, experimentation, design, engineering, or development work; thereby imposing new technology disclosure requirements on the subcontractors which are similar to those imposed on the prime contractor.

C. The clause defines "new technology" in terms of a reportable item:

- Any invention, discovery, improvement, or innovation, whether or not patentable.
- An item is reportable under a contract if it is either conceived or first actually reduced to practice in the performance of work under that contract.

D. In response to the requirements of the clause, the division will submit the following types of new technology data:

1. A separate report on each reportable item.
2. Annual reports and a final report pertaining to "in-house" activities which include:
   a. A summary of the review activities performed during the reporting period, and
   b. A listing and a summary of the new technology items disclosed during the reporting period.
   c. A separate report for each reportable item not previously reported, or
   d. A certification that there are no reportable items to report.
3. Statements which identify the subcontracts which contain the New Technology Clause and are individually valued in excess of $50,000. These statements shall provide the name and address of each subcontractor, a description of the work to be performed, an estimate of the subcontract cost, and an estimated subcontract completion date. Submittals are required as follows:
   a. Promptly upon the award of a subcontract containing the New Technology Clause and valued in excess of $50,000.
   b. Annually, and upon completion of the contract, to identify those subcontracts not previously reported or certifying that no such subcontracts were awarded during the reporting period.
4. Letters from the subcontractors certifying their compliance with the New Technology Clause as included in the subcontracts.

***

* E. A new technology reportable item must be reported on the New Technology Disclosure form. Excerpts from other reports may be reproduced and enclosed as a part of the new technology report, when properly referenced. Each report will be furnished to NASA within 30 days after being identified by the PROGRAM NEW TECHNOLOGY REPRESENTATIVE.

*REVISED **ADDED ***DELETED

F. Retrieval of New Technology Data

1. Each new technology report will be submitted to the contracting officer, or directly to his technology utilization officer, as specified within the Operations Directive (OD). Not all new technology reports will be published by NASA. The ultimate test for publication is whether the new technology can be utilized by industry for other than aerospace use.

2. The Denver Division obtains new technology data from NASA through two basic sources: NASA TECH BRIEFS and SPECIAL PUBLICATIONS.

* a. CENTRAL LIBRARY receives multiple copies of NASA TECH BRIEFS. One copy is retained for library reference; the remainder are distributed within the Denver Division. Cumulated indexes to the TECH BRIEFS by subject, personal author and report number are available in the library. The NASA TECH BRIEFS provide the name and location of the Technology Utilization Officer who may be contacted to acquire more detailed data.

* b. CENTRAL LIBRARY receives two copies of all SPECIAL PUBLICATIONS available from NASA. These documents, indexed in SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS (NASA STAR) may be borrowed by employees for a specified time period.

G. Operating Instruction GM-1-16-D1, "Obtaining and Utilizing Patents" defines regulations and responsibilities relating to petition for waiver, public use, sale, or publication of inventions. From paragraph II. F which follows, it should be noted that, in some cases, the preparation and processing of a new technology report may serve to initiate action under the division invention disclosure system. This procedure identifies the interface requirements between new technology reporting and the division invention disclosure system but does not supersede or replace that system.

II. RESPONSIBILITIES

A. PROGRAM CONTRACTS

When applicable, include the following information within the OD which authorizes division performance of the prime contract:

1. A statement which specifies that the New Technology Clause is a part of the prime contract.

2. The name and address of the NASA representative with whom MATERIEL may resolve questions or problems regarding subcontractor new technology reporting.

3. The name and address of the NASA representative who will receive distribution of the new technology data.

** 4. The names of the DIVISION and PROGRAM NEW TECHNOLOGY REPRESENTATIVES through whom all new technology data/reports will be processed.

B. PROGRAM DIRECTOR/MANAGER

1. Establish and implement a New Technology Program and appoint a PROGRAM NEW TECHNOLOGY REPRESENTATIVE.

2. Receive new technology reports from the PROGRAM NEW TECHNOLOGY REPRESENTATIVE. Review
*** and submit the approved reports to the DIVISION NEW TECHNOLOGY REPRESENTATIVE.

C. DIVISION NEW TECHNOLOGY REPRESENTATIVE

* 1. Assist Program Management in establishing and implementing the New Technology Program on all contracts containing the New Technology Clause.

2. Indoctrinate the PROGRAM NEW TECHNOLOGY REPRESENTATIVE with regard to his responsibilities for motivating, identifying and reporting new technology items.

3. As requested by the PROGRAM NEW TECHNOLOGY REPRESENTATIVE, evaluate proposed new technology items for suitability for disclosure.

* 4. Receive approved new technology disclosure reports and route the disclosure through LEGAL for patent consideration.

** 5. Convene and chair the Originality in New Technology Awards Program (ONTAP) Committee for quality assessments of each report prior to forwarding to PROGRAM CONTRACTS.

** 6. Review and approve all annual and final new technology summary reports prior to submittal to the customer.

** 7. Submit periodic reports to Headquarters, Martin Marietta Aerospace, New Technology Representative, on new technology items, by title and contract number. The report will also identify disclosures selected for an award during the reporting period.

8. Establish and maintain a file of all division new technology data transmittals and related correspondence; upon contract closeout assure that the file is retained as a part of the contract records.

D. PROGRAM NEW TECHNOLOGY REPRESENTATIVE

1. Stimulate the generation of new technology data, provide direction and assistance in the preparation of new technology reports for reportable items, and prepare the annual and the final new technology reports.

2. Make frequent periodic reviews of work in progress and completed work to assure that all reportable items have been submitted.

3. In association with the DIVISION NEW TECHNOLOGY REPRESENTATIVE, make determinations as to the suitability of new technology items for disclosure.

4. Submit the completed new technology reports to the PROGRAM DIRECTOR/MANAGER for review and approval.

* 5. Upon approval by the PROGRAM DIRECTOR/MANAGER, submit each new technology disclosure report to the DIVISION NEW TECHNOLOGY REPRESENTATIVE.

E. MATERIEL

1. Receive the OD from PROGRAM CONTRACTS which applies the New Technology Clause to the performance of the contract effort. Include the clause requirements in the subcontracts, as applicable.

* 2. Coordinate with the customer representative identified in the OD to resolve questions or problems which may arise in issuing and administering a subcontract. In the event of a refusal by a subcontractor to accept any of the provisions of the New Technology Clause, promptly notify the customer (through PROGRAM CONTRACTS) of such refusal.

* 3. Prepare, obtain DIVISION NEW TECHNOLOGY REPRESENTATIVE approval and submit to PROGRAM CONTRACTS the subcontract data identified in Paragraph I. D. 3.

4. Receive the subcontractors' letters which certify their compliance with the subcontract New Technology Clause and submit the letters to PROGRAM CONTRACTS.

* F. LEGAL

1. Receive a copy of each new technology report from the DIVISION NEW TECHNOLOGY REPRESENTATIVE which embodies an invention disclosure. Review and confirm the suitability for submittal of disclosures which embody an invention.

2. Advise the DIVISION NEW TECHNOLOGY REPRESENTATIVE of action required by the division to obtain or preserve title rights to inventions disclosed in the New Technology Reports.

G. INNOVATOR

1. Analyze the task being performed to assure that all reportable items are identified.

2. Prepare a report for each reportable item identified, obtaining the assistance of the PROGRAM NEW TECHNOLOGY REPRESENTATIVE as required.

H. PROGRAM CONTRACTS (Configuration & Data Management)

* 1. Prepare, issue and monitor schedules for all new technology data which the division will prepare and submit to the customer.

2. Receive new technology data from the DIVISION NEW TECHNOLOGY REPRESENTATIVE and MATERIEL. Inspect the data in accordance with the requirements of the contract, prepare transmittal letters, and arrange for distribution.

FORMS USED

New Technology Disclosure DEN 405010

***

## NEW TECHNOLOGY REPORTING

The SPACE ACT of 1958 contains a provision to stimulate transfer to the civilian economy of the New Technology developed under this large NASA activity.

NASA established a Technology Utilization Program (TUP) to rapidly effect this transfer. Under the TUP, all NASA contracts contained a New Technology Clause. This clause requires the contractor to actively

SEARCH
IDENTIFY
REPORT

all New Technology discovered during the performance of the contract, to benefit ALL the citizens of this country. Non-compliance can mean penalties to the company. Compliance can mean rewards for YOU.

YOU as a participant in a NASA program are required to report any

DISCOVERIES
IMPROVEMENTS
INNOVATIONS
INVENTIONS

CONCEIVED, DEVELOPED, OR REDUCED TO PRACTICE on the contract, whether patentable or not.

REPORTABLE ITEMS INCLUDE:

NEW OR IMPROVED

| | | |
|---|---|---|
| Apparatuses | | Engineering |
| Applications | | |
| Articles | | |
| Circuits | | Management |
| Compositions | | |
| Computer Programs | | |
| Concepts | | Manufacturing |
| Devices | | |
| Fixtures | | |
| Machines | IN | Quality Assurance |
| Materials | | |
| Methods | | |
| Processes | | Reliability |
| Products | | |
| Scientific Data | | |
| Systems | | Science |
| Techniques | | |
| Tools | | |
| Training | | Testing |

WHEN TO REPORT

Report as soon as the IDEA is conceived or developed while the

IDEA IS FRESH
DATA ARE AVAILABLE

HOW TO REPORT NEW TECHNOLOGY

Fill out the New Technology Disclosure Form (DEN 040510)

CLEARLY
CONCISELY

so that it can be readily understood by a person unfamiliar with the idea. New Technology Disclosure forms may be obtained from the Project New Technology Representative.

HOW TO REPORT NEW TECHNOLOGY (Continued)

Submit the disclosure to your Project New Technology Representative. It subsequently will be delivered to the Division NASA New Technology Representative, routed through the Legal Department for patent consideration, and forwarded to NASA.

POSSIBLE BENEFITS TO YOU

Recognition of your creative talent
Professional evaluation of the technical worth and commercial value of your
IDEA/INVENTION
$50 to $150 ONTAP* award from Martin Marietta for IDEAS
$150 to $1500 for PATENTABLE ITEMS PLUS 20% of the first $100,000 profit, 10% of the next $400,000 profit and 5% of the balance profit.
$25 or up from NASA plus a certificate for IDEAS if published
$50 or UP from NASA for INVENTIONS if patent is applied for
later consideration by NASA for awards from $250 to several $K.

FOR ADDITIONAL INFORMATION ON NASA NEW TECHNOLOGY, CONTACT

E. J. Tanner, Space Shuttle External Tank Representative
A. C. Sellke, Manned Space Systems Representative
J. H. Allen, Viking Representative
M. B. Chandler, Division New Technology Representative

* Originality in New Technology Award Program

## WHAT IS REPORTABLE NEW TECHNOLOGY?

The purpose of this article is to clarify the definition of "reportable New Technology" under the New Technology Clause of NASA contracts.

The term "reportable New Technology" seems to connotate "invention", a meaning which is far from true. Although inventions ARE reportable items, reportable items are not exclusively confined to inventions.

The key word in the phrase is "new", and "new" in this context means new and useful knowledge of any type. The following published Tech Briefs are listed to serve as examples of "reportable items".

| New or Improved | Tech Brief No. | Title |
|---|---|---|
| Technique | 70-10127 | Improved Beam Welding Technique |
| Product | 70-10311 | Radial Heat Flux Transformer |
| Process | 71-10256 | Plating by Glass-Bead Honing |
| Device | 71-10337 | Improved Smoke Generator for Low-Speed Wind Tunnel |
| Test Method | 71-10348 | Accelerated Battery Life Testing |
| Systems | 71-10251 | An Improved Telemetry System |
| Circuit | 71-10204 | Coarse Roll Rate Gain Control Circuit |
| Composition | 71-10217 | Promising Boron/Graphite/Resin Composites |
| Data | 71-10225 | Strain Gage Performance Above 1033K |
| Application | 71-10242 | Flat Cable Conductor Has Rotary & Linear Flexibility |
| Computer Program | 71-10244 | Manpower Forecast Program |
| Training | 71-10271 | Qualification & Certification of NDT Personnel |
| Fixture | 71-10280 | Weld Beveling of Large Diameter Pipes |
| Tool | 70-10117 | Integrated Circuit Flat-Pack Lead Bender |
| Machine | 70-10136 | Butt Welder for Fine Gage Wire |
| Material | 70-10135 | Ultra Thin Gage Plastic Film |

TO SUM UP - Report any new, useful knowledge, developed on NASA contracts that you think would be of benefit to mankind.

## Project ONTAP*

## NASA New Technology Award Program

**Background:** Project ONTAP has been established at Martin Marietta's Denver Division in conjunction with NASA's "new technology utilization" mission. NASA's objective is to provide non-aerospace industry with speedy access to new technologies developed during the course of aerospace research done under its contracts. Thus NASA has made it a contractual requirement to identify and report, in a prompt and timely manner, any invention, discovery, improvement or innovation, patentable or not. This program is in effect on the ET Project at MAF, just as any other Denver NASA Project.

**Award:** The ONTAP Committee will make cash awards for the most significant NASA new technology contributions. Reportable items must be submitted by the originator to the Program New Technology Representative who will get approval from the Program Manager. Then the item will be submitted to the Division New Technology Representative, for review and approval by him and, subsequently by the ONTAP Committee which he chairs. It is possible that more than one award, or none at all, will be made during any given month, depending on the quality and originality of items submitted. At the end of the year, the best of the monthly award-winning items will be selected to receive a special award.

**Eligibility:** All Martin Marietta Corporation employees working in support of NASA programs are eligible to compete for ONTAP awards.

**Award Criteria:** Disclosures will be evaluated on the basis of: (1) transferability of knowledge to the civil sector or non-aerospace industry, (2) benefit to company as a potential product for development or licensing, or from viewpoint of image enhancement if subject of technical paper, (3) technical content -- how unique, innovative, ingenious -- state of development, (4) method of presentation -- clarity, completeness.

**ONTAP Selection Committee:** Review and decisions will be made by a committee of five men: the Division New Technology Representative and representatives from Research and Development Department, Engineering Department, Quality Department, and Manufacturing Department. They will review items received during the month by the committee chairman. If fewer than three items are submitted to the committee during any month, none will be considered for an award until the following month.

**Award Announcement:** All contributors will be notified of the decision of the ONTAP committee on their disclosures. Presentation of checks to winning contributors will be made by their supervisors. Announcements of awards will be made in the division newspaper, space permitting.

**Procedures:** Denver Division Standard Procedure No. ET 49.1 provides the basic instructions for new technology reporting.

* Originality in New Technology Award Program

MARTIN MARIETTA CORPORATION
P.O. Box 179
Denver, Colorado 80201

# NEW TECHNOLOGY DISCLOSURE

REPORT NO.

CONTRACT NUMBER | NAME OF INNOVATOR | SOCIAL SECURITY NUMBER

TITLE

ABSTRACT

DETAILED DESCRIPTION

1. General purpose; improvement over prior methods, materials or devices; detailed technical description including drawings or sketches, or other documents; features believed to be new:

2. For reference drawings, specifications, technical reports, and test reports useful in the evaluation of this reported item, see attachments

3. Previous known publication of this reported item:

Form DEN 435010(5-71)

**APPLICATIONS**

Include known, contemplated, suggested, or possible applications. Emphasize industrial and other non-aerospace uses, in addition to the applications described in DETAILED DESCRIPTION (1.) above. Identify specific industries, processes or products in which the reportable item might find application or to which it might be related:

**WHAT ARE POSSIBLE EXTENSIONS OF THE INNOVATION**

**DEGREE OF DEVELOPMENT**

1. CHECK APPLICABLE STAGE:

- ☐ Concept only
- ☐ Development completed (prototype)
- ☐ Production

2. Did the item operate satisfactorily in the manner for which it was intended? ☐ Yes ☐ No

3. Is further development contemplated? ☐ Yes ☐ No

**TECHNOLOGICAL SIGNIFICANCE**

In relation to the present state of technology, this reportable item is considered to be a:

☐ Major improvement or breakthrough ☐ Substantial improvement ☐ Minor modification/ slight improvement

| NAME OF INNOVATOR DATE | NAME OF SUPERVISOR OF INNOVATOR DATE | NEW TECHNOLOGY REPORTING ENGINEER DATE |
|---|---|---|
| | | |

DENVER DIVISION

# Operating Instruction

No. GM-1-16-D1
Revision 1
Issued 6-2-71
Page 1 of 1

SUBJECT OBTAINING AND UTILIZING PATENTS

## DENVER DIVISION POLICY

It is a policy of the Denver Division to ensure that the utilization of patents, the publication of papers related to patents or patentable items, and the sale or use of items that may be the subject of patent application, comply with current customer regulations and related Martin Marietta Corporation directives in order to provide full protection of the interests of the Corporation and its customers.

## REGULATIONS AND RESPONSIBILITIES

A. Public Relations shall submit to the Division Patent Counsel for review, together with Technical Publications Clearance Form (MM 1007), all technical papers, reports and abstracts intended for public meetings or general publication.

B. The Contracts Manager shall notify the Division Patent Counsel concerning proposed use and/or sale of items that may be the subject of a patent application.

C. With regard to NASA programs:

1. The Division Patent Counsel shall promptly notify the appropriate New Technology representative and Contracts Manager in the event that the publication of papers, reports and abstracts, or the utilization and/or sale of material may start or has started the statutory period of limitations barring possible patent rights protection. Upon receipt of such notification the Contracts Manager will immediately notify the NASA Contracting Officer.

2. The Division Patent Counsel shall also be responsible for coordinating within the Martin Marietta Corporation, and for submitting to NASA, any petition for waiver of NASA title rights to inventions reportable under the New Technology Clause.

* 3. At the time of coordinating these petitions for waiver, and at all times in the interim pending a Company decision to petition for the waiver, all new technology and/or inventions, whether or not the subject of, or in any way connected with, the invention for which the waiver is being sought, will continue to be promptly reported to NASA in accordance with the requirements of GM-7, EN-12, and EN-12-(1)-D1.

(EN-8-(1)-D1)

A. E. Hawkins
Director
Administration

*Revised

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